Cranston, Daniel W.; **Kim, Seog-Jin**
List-coloring the square of a subcubic graph. (English) ⎡Zbl 1172.05023⎤
J. Graph Theory 57, No. 1, 65-87 (2008).

Summary: The square G^2 of a graph G is the graph with the same vertex set G and with two vertices adjacent if their distance in G is at most 2. Thomassen showed that every planar graph G with maximum degree $\Delta(G) = 3$ satisfies $\chi(G^2) \leq 7$. Kostochka and Woodall conjectured that for every graph, the list-chromatic number of G^2 equals the chromatic number of G^2, that is, $\chi_l(G^2) = \chi(G^2)$ for all G. If true, this conjecture (together with Thomassen's result) implies that every planar graph G with $\Delta(G) = 3$ satisfies $\chi_l(G^2) \leq 7$. We prove that every connected graph (not necessarily planar) with $\Delta(G) = 3$ other than the Petersen graph satisfies $\chi_l(G^2) \leq 8$ (and this is best possible). In addition, we show that if G is a planar graph with $\Delta(G) = 3$ and girth $g(G) \geq 7$, then $\chi_l(G^2) \leq 7$. Dvořák, Škrekovski, and Tancer showed that if G is a planar graph with $\Delta(G) = 3$ and girth $g(G) \geq 10$, then $\chi_l(G^2) \geq 6$. We improve the girth bound to show that if G is a planar graph with $\Delta(G) = 3$ and $g(G) \geq 9$, then $\chi_l(G^2) \leq 6$. All of our proofs can be easily translated into linear-time coloring algorithms.

MSC:

05C15	Coloring of graphs and hypergraphs
05C12	Distance in graphs

Cited in **1** Review
Cited in **20** Documents

Keywords:

graph coloring; list coloring; Wegner's conjecture; Moore graph

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